

## *Xenosaurus newmanorum* Taylor, 1949 (Squamata: Xenosauridae): Occurrence in the state of Hidalgo, Mexico

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**ABSTRACT:** Herein we report 22 individuals of *Xenosaurus newmanorum* representing a new state record for Hidalgo, Mexico from the Municipality of Pisaflores. Previously, this species was known only from the Municipality of Xilitla in San Luis Potosí. These new records extend the distribution of this species 13.6 km south of its previously known occurrence. We also compare total body and tail lengths for the lizards in addition to cloacal temperatures and several measurements associated with microhabitat characteristics, which are equivalent at all three sites. That microhabitat congruence suggests that its preservation is critical for protecting *X. newmanorum* from population decline.

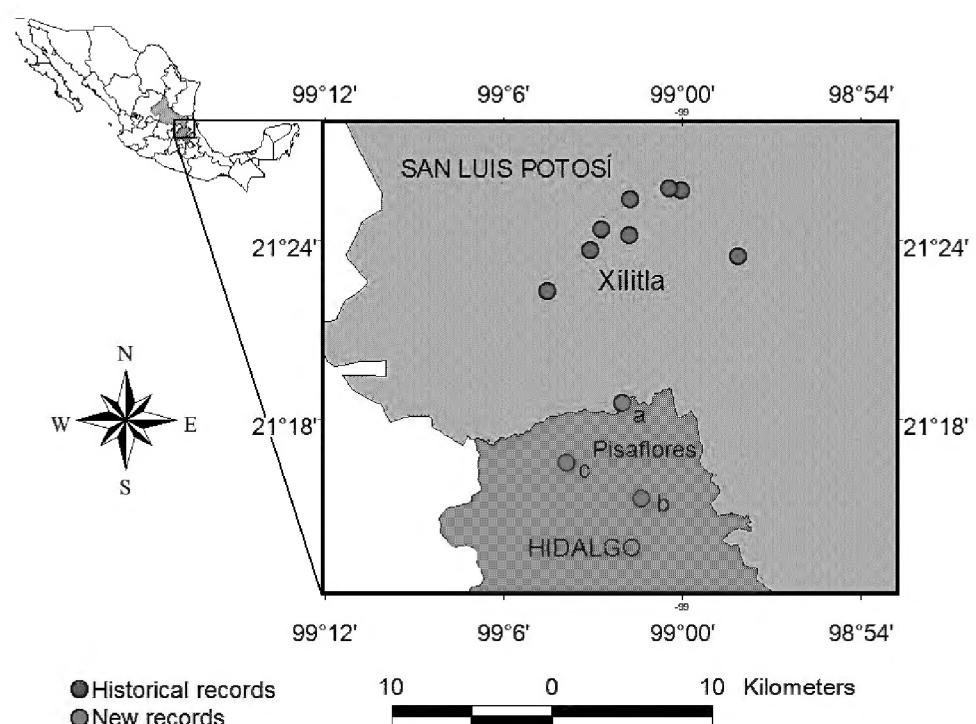
In Mexico, the genus *Xenosaurus* is represented by twelve species: *X. agrenon*, *X. arboreus*, *X. grandis*, *X. mendozai*, *X. newmanorum*, *X. platyceps*, *X. penai*, *X. phalaroanthereon*, *X. rackhami*, *X. rectocollaris*, *X. sanmartinensis* and *X. tzacualtipantecus* (Nieto-Montes de Oca 1999; Nieto-Montes de Oca *et al.* 2001; Woolrich-Piña and Smith 2012; Nieto-Montes de Oca *et al.* 2013). These species are distributed on both the Atlantic and Pacific versants of Mexico, from southern Tamaulipas and eastern Guerrero southward to Alta Verapaz, Guatemala (King and Thompson 1968). The species of the genus *Xenosaurus* are distributed allopatrically in montane regions at elevations from 300 to 2600 m in diverse habitats, including cloud forest, subtropical forest, tropical dry forest, and oak forest (Ballinger *et al.* 2000; Lemos-Espinal *et al.* 2012).

*Xenosaurus newmanorum* was previously known only from the Sierra Madre Oriental in southeastern San Luis Potosí in the Municipality of Xilitla, at elevations from 600 to 800 m in subtropical forest (Campbell 1999) and secondary vegetation such as coffee and citrus groves (Taylor 1949; Lemos-Espinal *et al.* 2000). A record for this species from the Ejido La Selva, Huayacocotla, Veracruz, reported by Camarillo-Rangel (1998), actually applies to another species, *Xenosaurus tzacualtipantecus* (Lemos-Espinal *et al.* 2012; Woolrich-Piña and Smith 2012); specimens from Gómez Farías, Tamaulipas referred to by Martin (1955) were in fact *X. platyceps* (Lemos-Espinal *et al.* 2000).

*Xenosaurus newmanorum* is a medium-sized lizard, with a maximum snout-vent length (SVL) of 124 mm in females and 118 mm in males. This species differs from its congeners by having the zygomatic and postocular ridges separated, the supraorbital semicircles in contact or separated medially by one scale row, a smooth tympanum, and no enlarged canthal scales (Taylor 1949; Lemos-Espinal *et al.* 2012). The color pattern consists of a V-shaped dark mark on the neck; the dorsum usually exhibits four pale crossbands that alternate with dark

crossbands, an immaculate pale gray to gray venter, and laterally-interrupted, dark-margined pale caudal bands (Taylor 1949; Lemos-Espinal *et al.* 2012).

While sampling the herpetofauna of the Municipality of Pisaflores in Hidalgo, Mexico during the months of February to April, 2013, we collected specimens of *Xenosaurus newmanorum* from three different localities in this municipality (Figure 1). Collection of these specimens was authorized by SEMARNAT (Secretary for Environment Protection Management), under permit number SGPA/DGVS/02419/13. The total number of specimens observed was 22; however, we collected only three to verify their identification. Specimens are deposited in the collection of amphibians and reptiles of the Centro de Investigaciones Biológicas (CIB) of the Universidad Autónoma del Estado de Hidalgo, catalogue numbers CIB 4296-4298. The remaining specimens were released at point of capture immediately after handling.



**FIGURE 1.** Geographic distribution of *Xenosaurus newmanorum*, including the new localities reported for the state of Hidalgo. Red circles: the three new localities (a: Plan de Zapotal, b: La Gargantilla and c: Casas Viejas) in the Municipality of Pisaflores, Hidalgo. Green circles: the previously known localities in the Municipality of Xilitla, San Luis Potosí.

We measured snout-vent length (SVL to nearest 1.0 mm), tail length (TL), and recorded the temperature of the body, microhabitat and environment (Quick Reading Thermometer 0-50°C). Measurements of microhabitats such as depth, height above ground, and width of crevices were measured using a metal graduated ruler (500 mm). Individuals collected were sexed by examination of gonads.

We obtained the first specimens of *Xenosaurus newmanorum* on 23 February 2013 at Plan de Zapotal (21°18'09"N, 98°58'16"W, 389 m elevation), located 8.3 airline km southeast from the nearest locality recorded in the Municipality of Xilitla, San Luis Potosí (Figure 1). We encountered the lizards around 5:30 h in crevices between rocks stacked by humans, to five m from a streambed located in subtropical forest (Figure 2A). We took measurements from the four individuals and collected one adult male (CIB-4296). The four individuals had a mean SVL of  $100.3 \pm 12.0$  mm (66-118 mm) and a mean tail length of  $100.8 \pm 12$  mm (68-119 mm). The mean ambient temperature was  $23.2 \pm 0.8$  °C (23.1-23.4°C), mean of the microhabitat temperature was  $22.1 \pm 0.3$  °C (21.2-22.5°C), and mean cloacal temperature of the lizards was  $21.6 \pm 0.3$  °C (20.7-22.0°C). Mean depth of the microhabitat (limestone cracks) was  $217.0 \pm 15.0$  mm (172-235 mm), mean opening width  $24.8 \pm 4.1$  mm (15-32 mm), and mean distance above ground  $386.8 \pm 37.2$  mm (300-482 mm).

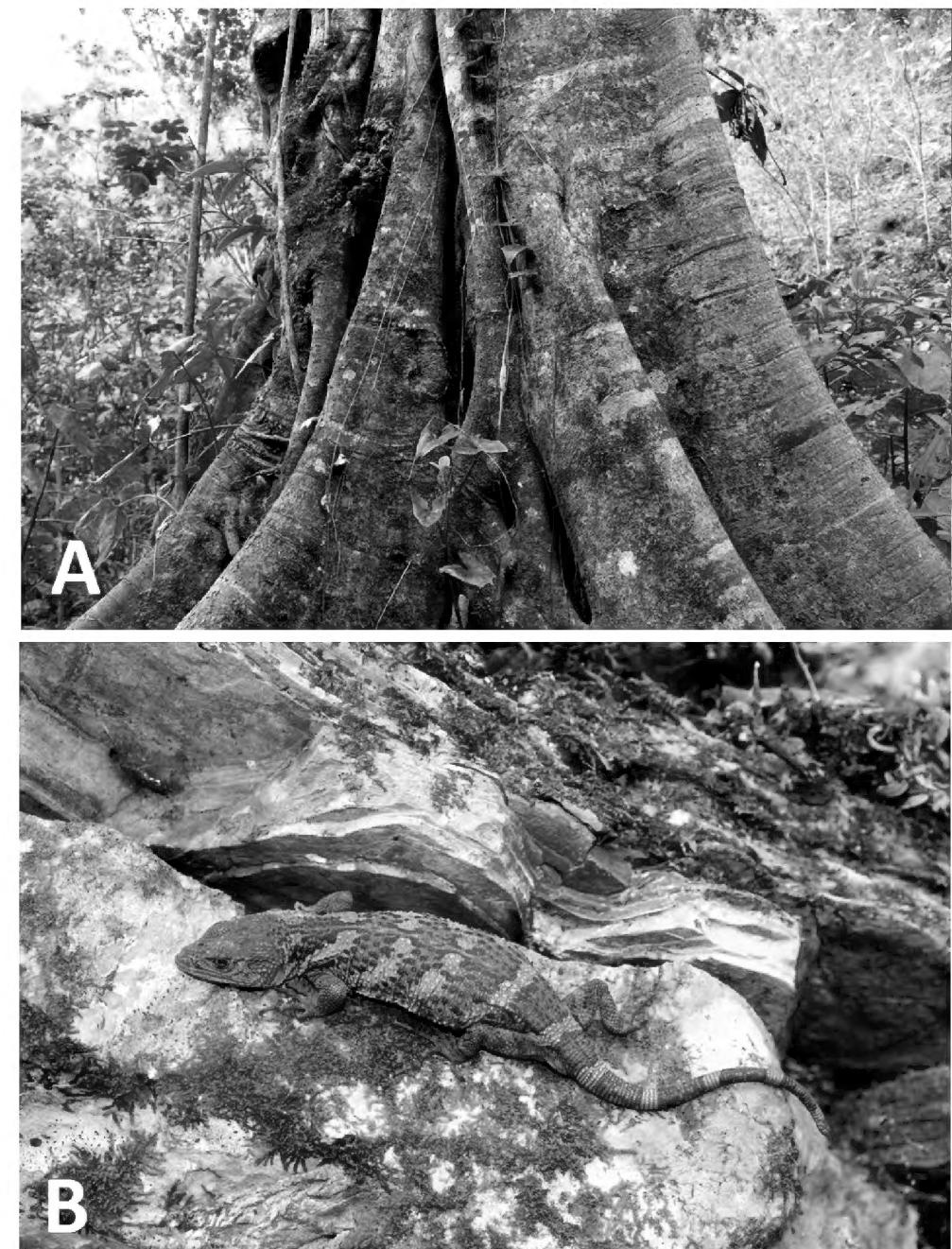
We performed the second sampling on 24 March 2013 at La Gargantilla (21°14'57"N, 98°57'39"W, 825 m elevation) in the same municipality in a shaded coffee grove surrounded by subtropical forest, located 13.6 airline km to the southeast from the nearest locality



**FIGURE 2.** A) Subtropical forest at Plan de Zapotal. B) Shaded coffee grove at Casas Viejas. Photographs by CBI and JDLT.

recorded in the Municipality of Xilitla in San Luis Potosí (Figure 1). We found five individuals around 14:30 h, but collected only one juvenile female (CIB-4297). We encountered the individuals in crevices of a limestone rock wall seven m from a dry riverbed. The mean SVL of the five individuals was  $119.2 \pm 6.0$  mm (96-129 mm) and the mean tail length  $121.6 \pm 5.6$  mm (100-130 mm). The mean ambient temperature was  $18.5 \pm 1.6$  °C (16.1-24.3°C), mean of the microhabitat temperature was  $18.5 \pm 1.5$  °C (16.7-24.5°C), and mean cloacal temperature was  $19.3 \pm 0.9$  °C (17-22.3°C). Mean depth of the microhabitat (limestone cracks) was  $260.0 \pm 42.0$  mm (160-419 mm), mean opening width  $26.0 \pm 5.0$  mm (16-45 mm), and mean distance above ground  $373.0 \pm 141.0$  mm (205-935 mm).

Finally, the third sampling took place on 26 April 2013 at 18:00 h at Casas Viejas in the same municipality (21°16'09"N, 99°00'09"W, 880 m elevation), located 10 airline km to the southeast of the nearest known locality in the Municipality of Xilitla, San Luis Potosí (Figure 1). We encountered 13 individuals, of which we also collected only a single subadult male specimen (CIB-4298). The observed individuals were found in a shaded coffee grove surrounded by subtropical forest, also near a dry riverbed (Figure 2B). Mean SVL was  $111.4 \pm 3.9$  mm (82-132 mm) and mean tail length was  $101.3 \pm 3.6$  mm (76-121 mm). We found the individuals in shaded microhabitats with a mean ambient temperature of  $24.5 \pm 0.6$  °C (21.1-28.5°C) and a mean microhabitat temperature of  $23.0 \pm 0.4$  °C (21.0-26.0°C). Mean cloacal temperature was  $24.8 \pm 0.3$  °C (23.5-27.0°C). We found ten individuals in rock crevices,



**FIGURE 3.** A) A previously unknown microhabitat type for *Xenosaurus newmanorum* (tree crevices) at the Casas Viejas locality. B) Female *X. newmanorum* SVL 132 mm encountered at Casas Viejas. Photographs by JDLT and Luis Manuel Badillo-Saldaña.

and three in crevices of living trees (Figure 3 A-B). Both, rock and tree crevices had a mean depth of  $253.3 \pm 19.0$  mm (160-400 mm), a mean crevice width of  $35.7 \pm 3.3$  mm (16-50 mm), and a mean distance above ground of  $630.0 \pm 132.3$  mm (231-1890 mm).

The stomach contents of the three individuals collected consisted of insects of the orders Orthoptera, Hemiptera, Hymenoptera and spiders (order Araneae), which are prey types not recorded previously for *X. newmanorum*.

The individuals of *X. newmanorum* reported herein represent the first records for Hidalgo, and subsequently increase the number of species of lizards known for the state to 39 (Ramírez-Bautista *et al.* 2010). Additionally, they extend the range of this species 13.6 km to the south of the previously-known localities (Lemos-Espinal *et al.* 2012). The restricted geographic and ecological distribution of this species is of major conservation concern. be “Currently, *X. newmanorum* is regard as Endangered by the IUCN (2013), and considered a species with a high score (15) of environmental vulnerability (EVS) by Wilson *et al.* (2013). The microhabitat characteristics of the three sites where we found this lizard are very similar to one another and suggest that this species might not be able to survive in a highly modified environment.

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